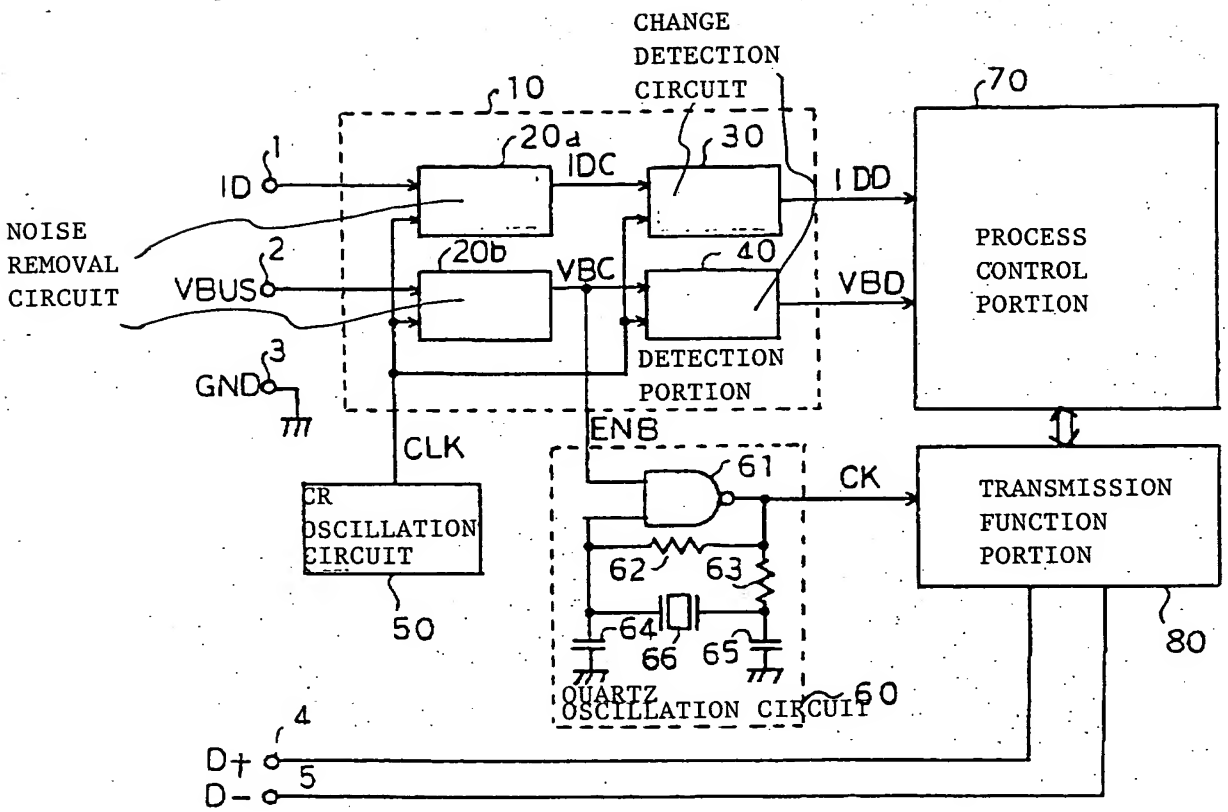
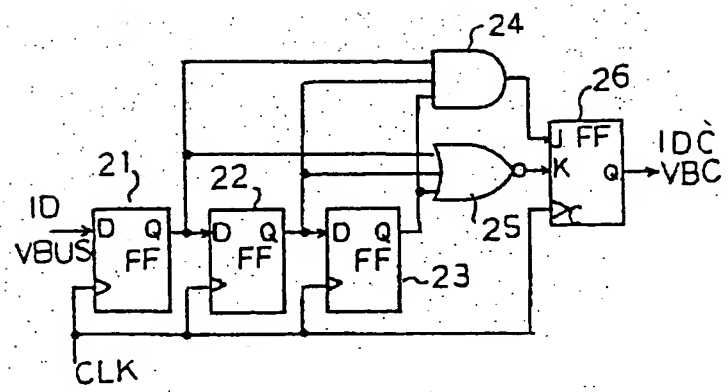

CHANGE
DETECTION
CIRCUIT
10
70
20a
30
1
ID
IDC
IDD
NOISE
REMOVAL
CIRCUIT
2
VBUS
20b
VBC
40
VBD
PROCESS
CONTROL
PORTION
3
GND
DETECTION
PORTION
ENB
CLK
61
CK
CR
OSCILLATION
CIRCUIT
TRANSMISSION
FUNCTION
PORTION
62
63
64
66
65
50
80
QUARTZ
OSCILLATION CIRCUIT
60
4
D+
5
D-

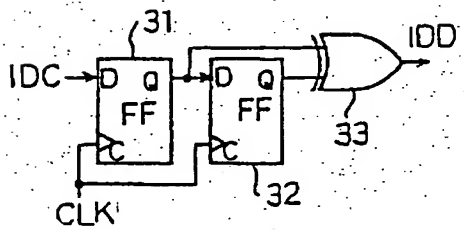
FIG. 1

FIG. 2A



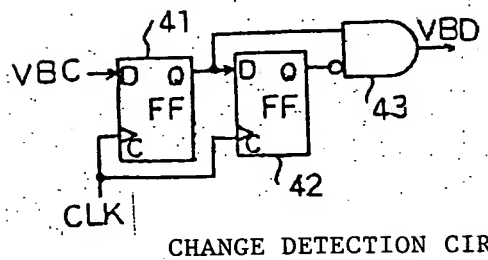
NOISE REMOVAL CIRCUIT 20

FIG. 2B



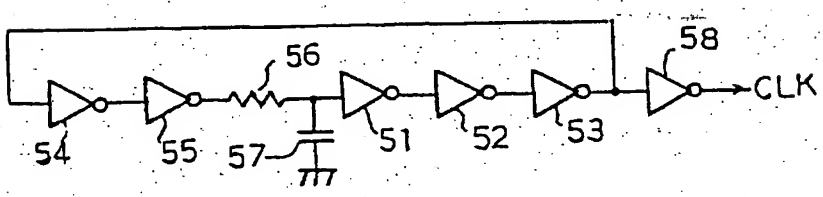
CHANGE DETECTION CIRCUIT 30

FIG. 2C



CHANGE DETECTION CIRCUIT 40

FIG. 2D



CR OSCILLATION CIRCUIT 50

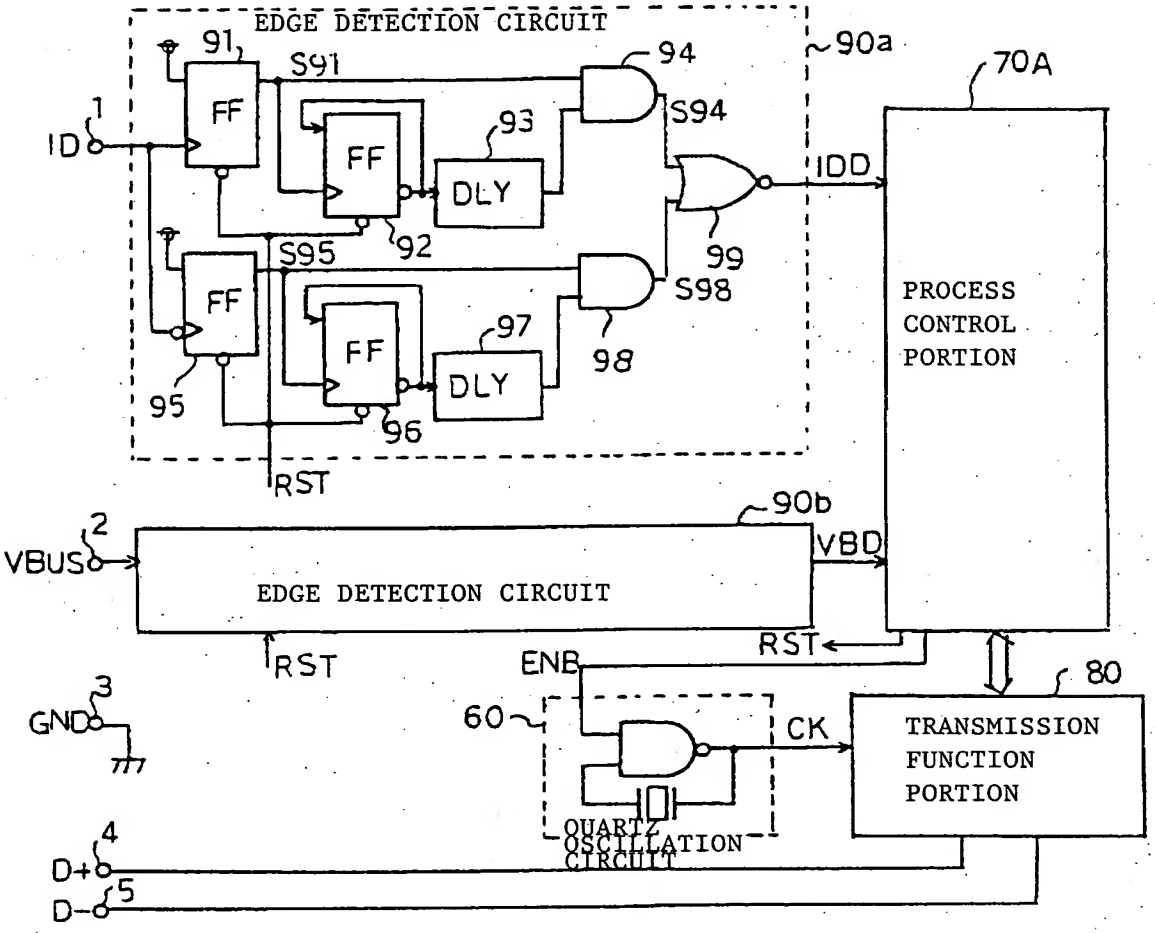

EDGE DETECTION CIRCUIT
91
S91
94
90a
70A
1
ID
FF
93
S94
FF
DLY
IDD
92
99
S95
PROCESS
CONTROL
PORTION
FF
S98
97
98
FF
DLY
95
96
RST
90b
2
VBUS
VBD
EDGE DETECTION CIRCUIT
RST
RST
ENB
80
3
GND
60
CK
TRANSMISSION
FUNCTION
PORTION
QUARTZ
OSCILLATION
CIRCUIT
4
D+
5
D-

FIG. 3

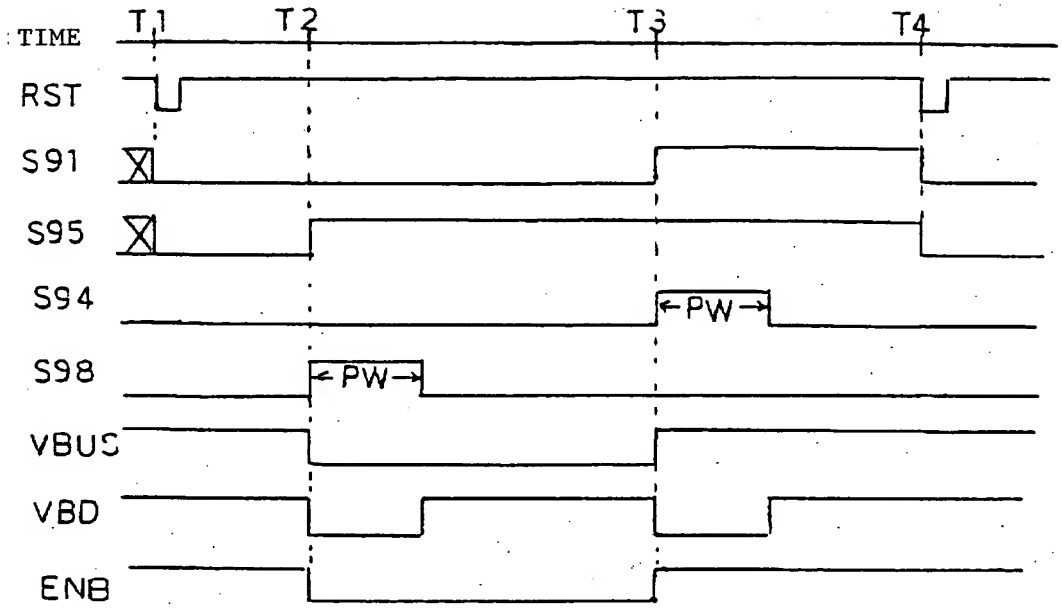


FIG. 4

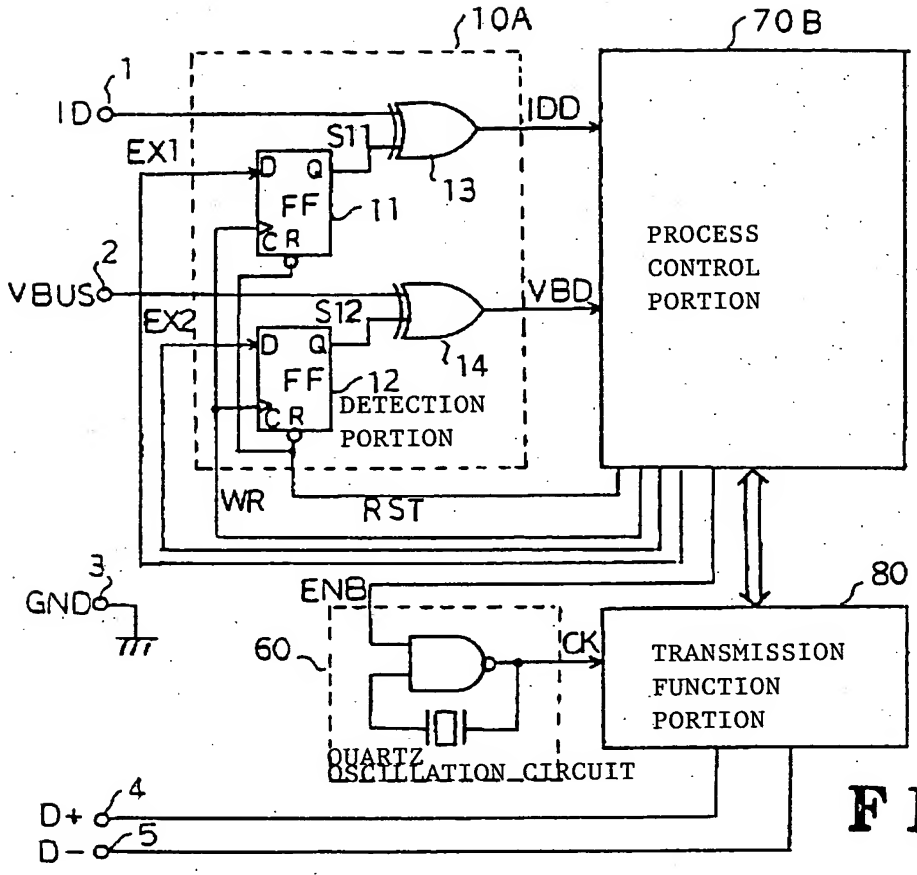

10A
70B
1
ID
IDD
S11
EX1
D Q
FF
11
13
C R
PROCESS
CONTROL
PORTION
2
VBUS
VBD
S12
EX2
D Q
FF
12
14
C R
DETECTION
PORTION
WR
RST
3
GND
ENB
80
60
CK
TRANSMISSION
FUNCTION
PORTION
QUARTZ
OSCILLATION CIRCUIT
4
D+
5
D-

FIG. 5

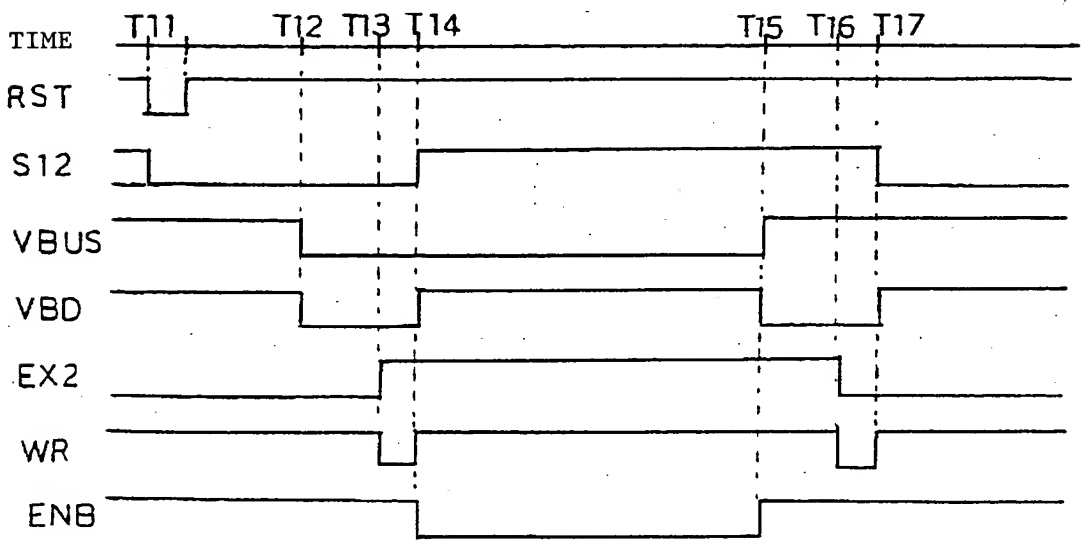

TIME
T11
T12
T13
T14
T15
T16
T17
RST
S12
VBUS
VBD
EX2
WR
ENB

FIG. 6

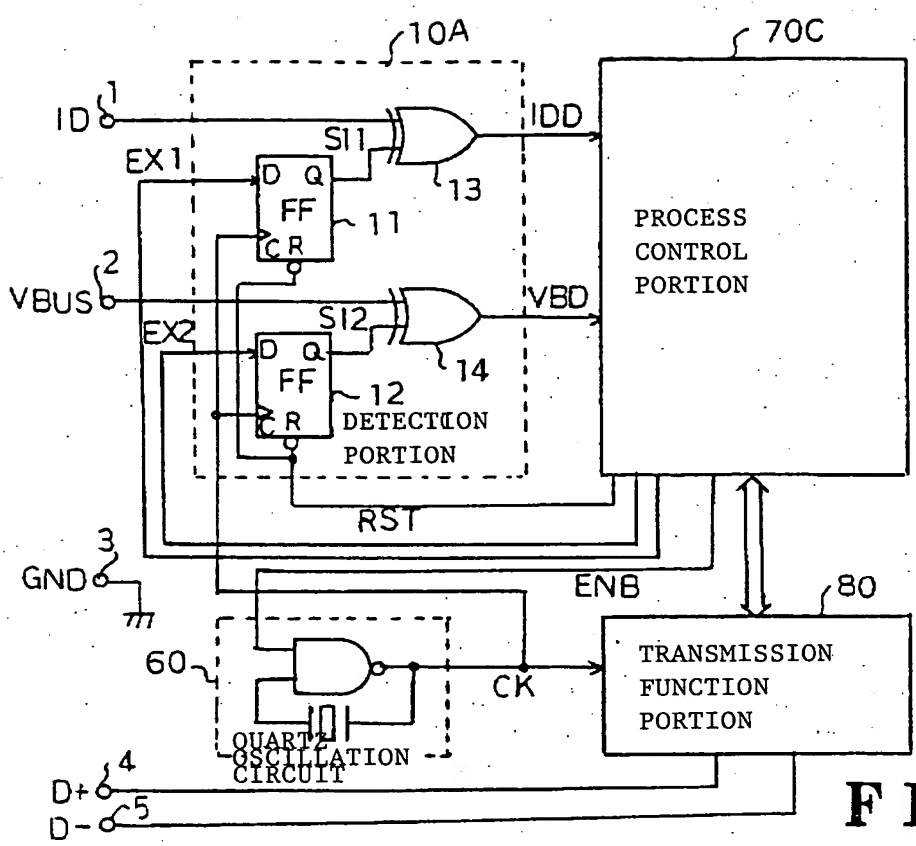

10A
70C
ID
1
IDD
S11
EX1
D Q
FF
11
C R
13
PROCESS
CONTROL
PORTION
2
VBUS
VBD
S12
EX2
D Q
FF
12
C R
14
DETECTION
PORTION
RST
3
GND
ENB
80
60
CK
TRANSMISSION
FUNCTION
PORTION
QUARTZ
OSCILLATION
CIRCUIT
4
D+
5
D-

FIG. 7

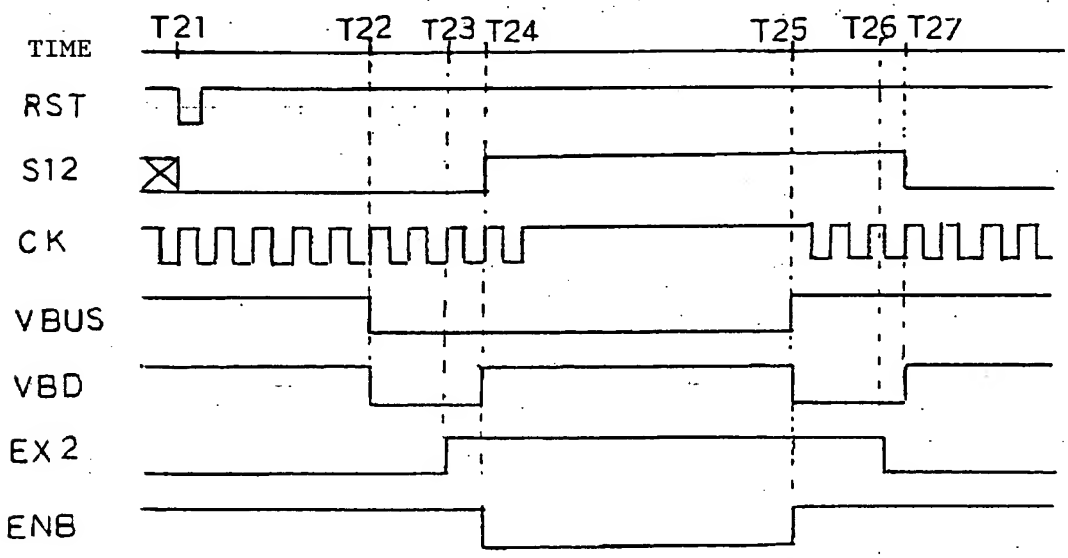

TIME
T21
T22
T23
T24
T25
T26
T27
RST
S12
CK
VBUS
VBD
EX2
ENB

FIG. 8

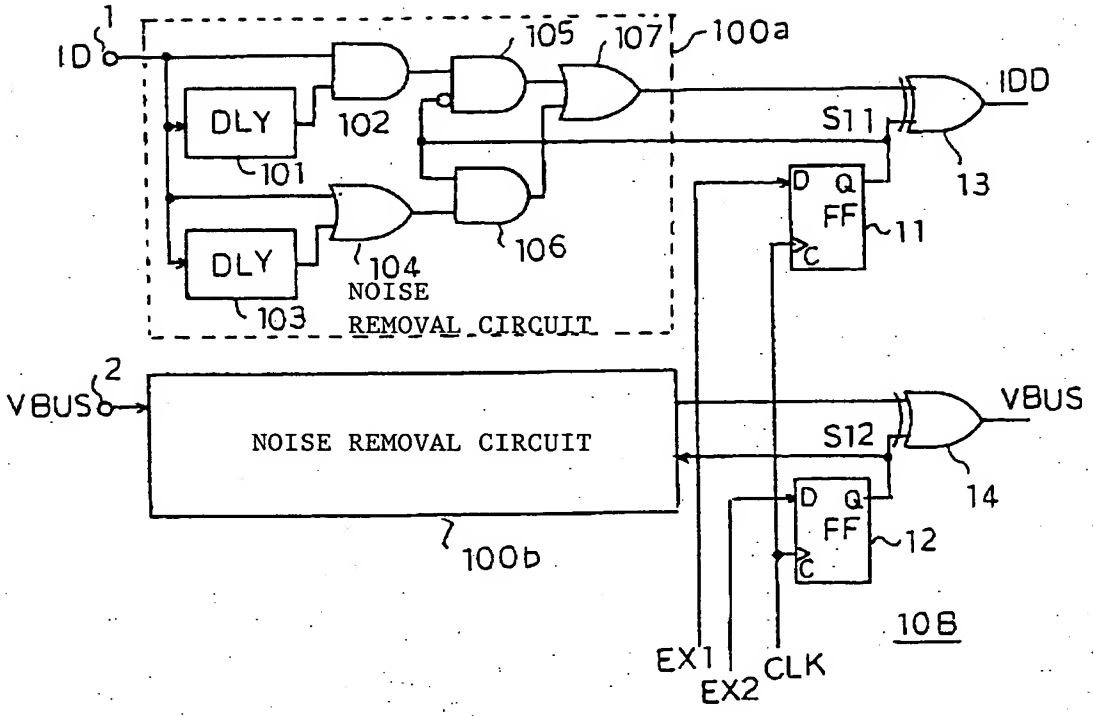

1
IDD
105
107
100a
DLY
102
101
S11
IDD
13
D Q
FF
11
C
DLY
104
106
NOISE
103
REMOVAL CIRCUIT
2
VBUS
NOISE REMOVAL CIRCUIT
VBUS
S12
14
D Q
FF
12
C
100b
108
EX1
EX2
CLK

FIG. 9